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THE U.S. ARMY CORPS IN EUROPE -- WILL
ITS COMMAND AND CONTROL SYSTEM
SUPPORT OPERATIONAL MOVEMENT?

A Monograph

by

Lieutenant Colonel Jimmie F. Holt
Infantry



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School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

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For this to work, the U.S. corps must be able to conduct operational moves to position forces and to conduct offensive operations to exploit opportunities. Critical to this effort is whether or not the current command and control system will support the operations required by the tenets of airland battle.

Sophisticated new technology and vastly increased firepower may mean that future battles in Europe are likely to be more intense and of greater scope, so that they begin to acquire a different character from those of the past. However, the lesson from the past is that operational movement is essential to effective use of combat power within a theater.

The command and control system of the U.S. Army corps today has several significant training, personnel, and equipment limitations which severely restrict its capability to perform operational movements such as those conducted by comparable size units in World War II and even World War I. This weakness in the basic fabric of command and control at the operational level is such that organizational, structural, and functional changes must be made in the U.S. Army corps in order for it to regain the capability to conduct operational movement in Europe.

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ABSTRACT

THE U.S. ARMY CORPS IN EUROPE - WILL ITS COMMAND AND CONTROL SYSTEM SUPPORT OPERATIONAL MOVEMENT? by LTC Jimmie F. Holt. USA, 51 Pages.

For the past 40 years, the two U.S. Army corps in Europe have planned for the defense of the Inter-German Border. This defensive orientation has evolved into a science of delay with the hope of eventual counterattack and ultimate restoration of the border. The U.S. Army defensive doctrine has progressed through the concepts of area and mobile defense, the active defense, and now to the Airland Battle in which the focus is on the destruction of the follow-on forces while "fixing" the initial echelons.

The key to success in conducting the Airland Battle is seen as the aggressive use of agility, initiative, depth, and synchronization by numerically weaker forces to disrupt the enemy decision cycle by attacking his command and control system. Additionally, the destruction of his first echelon forces' fighting capability is to be accomplished in combination with its isolation from combat service support and reinforcements.

For this to work, the U.S. corps must be able to conduct operational moves to position forces and to conduct offensive operations to exploit opportunities. Critical to this effort is whether or not the current command and control system will support the operations required by the tenets of airland battle.

Sophisticated new technology and vastly increased firepower may mean that future battles in Europe are likely to be more intense and of greater scope, so that they begin to acquire a different character from those of the past. However, the lesson from the past is that operational movement is essential to effective use of combat power within a theater.

The command and control system of the U.S. Army corps today has several significant training, personnel, and equipment limitations which severely restrict its capability to perform operational movements such as those conducted by comparable size units in World War II and even World War I. This weakness in the basic fabric of command and control at the operational level is such that organizational, structural, and functional changes must be made in the U.S. Army corps in order for it to regain the capability to conduct operational movement in Europe.

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Section 1 INTRODUCTION

A commander-in-chief cannot take as an excuse for his mistakes in warfare an order given by his sovereign or his minister, when the person giving the order is absent from the field of operations and imperfectly aware or wholly unaware of the latest state of affairs. It follows that any commander-in-chief who undertakes to carry out a plan which he considers defective is at fault; he must put forward his reasons, insist on the plan being changed, and finally tender his resignation rather than be the instrument of his army's downfall.¹

Napoleon Bonaparte

For the past forty years, the U.S. Army in Europe has planned for the defense of the Inter-German border. This defensive orientation has evolved into a science of delay supported by the goal of eventual counterattack and restoration of the border. Successively, the U.S. Army defensive doctrine has progressed through the Area and Mobile Defense, the Active Defense and now to Airland Battle where the focus is on destruction of the follow-on forces while "fixing" the initial echelons.² The key is for numerically weaker forces to use the tenets of agility, initiative, depth, and synchronization to disrupt the enemy commander's decision cycle by attacking his command and control system and to destroy the first echelon forces' fighting capability by isolating it from its combat service support and reinforcements.³ For this to work, the U.S. Army corps, the largest tactical force in the U.S. Army, must be able to position forces in the defense and to conduct offensive operations to exploit theater opportunities. Critical to this effort is whether or not the current command and control system will support the operations required by the tenets of Airland Battle.

When one considers the magnitude of the task facing the U.S. Army forces in Europe in terms of superior numbers of Soviet combat forces, against an evolved tactical doctrine called Airland Battle, the question can legitimately be asked: Can the mission be done and what are the critical requirements?

In the Second World War, corps and armies seemed to be able to move rapidly on the battlefield to exploit tactical opportunities or to respond to emergencies. It has been in excess of forty years since the U.S. Army has conducted large scale operational level maneuver in Europe. It has since then developed a sophisticated but immobile defense designed to protect maximum territory as close to the Inter-German border as possible.

The Corps is now the largest tactical unit in the U.S. Army in Europe. As such it is the level at which operational level movement will take place, if it occurs at all.⁴

Army operational requirements and desired results are often stated in terms of Battlefield Operating Systems. Significantly, the single element which acts as a common denominator for them all is Command and Control. Therefore, the real question for the Army corps of today is intricately tied to the issue of command and control support of operational maneuver. If we assume that operational movement is a way a smaller defending force can be successful in operations against a numerically larger force, the question which must be answered remains: Is the U.S. Army corps command and control system adequate for operational movement in Central Europe today?

The purpose of this paper is to examine command and control in the context of the defense of Europe today measured against the capabilities and accomplishments of the U.S. Army in previous wars. U.S. Army units comparable in size to the U.S. Army corps in Europe today were able to make significant, often radical movements in response to operational requirements in both the First and Second World Wars. For Operational Art to be practiced by the U.S. Army in Europe in the next war, it is safe to assume that its corps should be able to conduct operational moves. Operational movement will be explored as a concept dependent upon command and control for success on the battlefield. Type operational missions will be assigned to U.S. Army corps and their higher headquarters and then they will be studied against the context of current command and control capabilities and requirements. Finally, the implications of this study of the capability of the U.S. Army corps Command and Control System can be expected to show that there is a serious weakness in the fabric of command and control at the operational level which seriously limits the U.S. Army corps capability to conduct operational movement today. It is concluded that organizational and structural changes should be made to return the capability to conduct operational movement to the U.S. Army corps in Europe now.

Section II Theory, Doctrine, and Organization

Of decisive significance in a future war will be its initial period....The more effectively a country uses at the outset the troops and the equipment it has accumulated before the war, the greater the results it can achieve at the very beginning of a war, and the more quickly victory is achieved.⁵

Marshal Sokolovsky,
"Voennaya Strategiya" (Voenazdat, 1968)

As long as there have been armies, their commanders have wrestled with the problem of determining how to best defeat the enemy, how best to communicate their decisions to subordinates, and how to control their armies during battle. Numerous concepts and theories have evolved into what we in the U.S. Army have termed modern command and control theory. Webster defines theory as "The general or abstract principles of a body of fact, a science, or an art."⁶ If the dictionary helps us to understand what a theory is, Clausewitz helps us understand what it does. "The primary purpose of any theory is to clarify concepts and ideas that have become, as it were confused and entangled."⁷ Thus, it is necessary to conceptually understand theoretical and doctrinal foundations. As an operating system, command and control is a common denominator against which the reasons for earlier successes can be measured and future requirements, stemming from anticipated needs for operational movement, can be anticipated.

Modern command and control theory can best be described as a group of principles that represent an attempt to apply order to concepts and ideas that have become confused and entangled over time. The framers of modern command and control theory have incorporated five principles of management that apply to the conduct of military operations: 1)

planning, 2) organizing, 3) directing, 4) coordinating, and 5) controlling, into what are called components of the command and control system. The components of the current U.S. Army Command and Control System are:

- 1) The C² organization (commander and his staff)
- 2) The C² process (planning, coordinating, directing, and controlling)
- 3) The C² facilities (command posts and communications systems)⁸

It is important to note that modern command and control theory has included as its central focus the commander and with him the concept of leadership. In order for combat power to be employed successfully on the modern battlefield, it is necessary for the commander to ensure that various combat functions are integrated and executed. However, the size and diversity of modern military operations collectively dictate a very old concept of division of labor. A single commander is not normally able to personally apply the principles of command and control for his entire force. Hence, the development of a system of subordinate commanders and staffs to laterally integrate the five battlefield functional areas at each tactical level of command. These battlefield functional areas are: 1) maneuver, 2) air defense, 3) fire support, 4) intelligence, and 5) combat service support.⁹ Incidentally, some may argue that mobility, counter-mobility, and survivability and command and control combine with the functional areas to bring the total to seven battlefield operating systems which incorporate the concept of functional area. In fact, FM 101-5 discusses the seven battlefield

operating systems as an "integral part of the five battlefield functional areas."¹⁰ It can be said that the command and control system is the integration element for each of the other systems or functional areas as they each interrelate through the command and control system for the commander. FM 101-5 points out that command and control cannot be separated from the other battlefield operating systems because it connects the other six enabling commanders to conduct planning, directing, coordinating, and controlling activities.¹¹ In fact, JCS Pub 1 defines command and control as "The exercise of authority and direction by a properly designated commander over assigned forces in the accomplishment of the mission."¹² JCS Pub 1 goes on to emphasize that decisive development and application of combat power is the goal of C2.¹³ However, command and control may best be defined by describing its parts. According to JCS Pub 1, command is as follows:

The authority that a commander in the military service lawfully exercises over subordinates by the virtue of rank or assignment. Command includes the authority and responsibility for effectively using available resources and for the planning and the employment of, organizing, directing, coordinating, and controlling military forces for the accomplishment of assigned missions.¹⁴

TC 101-5 described command in nearly the same manner as follows:

Command is a process by which you, the commander, infuse your will and intent among your subordinates. Command includes the authority and responsibility for effectively using available resources, and for planning the employment of, organizing, directing, coordinating, and controlling military forces to accomplish assigned missions.¹⁵

Finally, control is described according to FM 101-5 as follows:

Control is the process through which you, with the assistance of your staff, direct battlefield activities.¹⁶

Modern command and control theory recognizes the requirement for vertical connectivity of the various command levels. The U.S. Army has conceptually outlined the Army Command and Control System in the Army Command and Control Master Plan, Volume 1, Concepts and Management. In this plan the Army Command and Control System is defined as follows:

The aggregate means by which Army commanders employ and sustain military forces in a theater of operations. It consists of organizations, training, and C² doctrine.¹⁷

The tactical portion of the Army Command and Control System is called the Army Tactical Command and Control System. The Tactical Command and Control System functions at Corps level and below are illustrated on page 38.

Command and Control theory, therefore provides the basis from which command and control doctrine, organization, and force structure are formulated. The basis for current U.S. Army tactical command and control doctrine is found in a number of documents. However, all draw on the same theoretical and historical foundations. The Army capstone warfighting manual, FM 100-5 Operations, says the following about doctrine:

Tactics, techniques, procedures, organizations, support structure, equipment and training must all derive from it. It must be rooted in time-tested theories and principles, yet, forward-looking and adaptable to changing technologies, threats, and missions.¹⁸

FM 100-5 succinctly outlines the ultimate measure of the effectiveness of command and control systems:

The ultimate measure of command and control effectiveness is whether the force functions more effectively and more quickly than the enemy.¹⁹

Thus, a look at some historical examples of operational movement to glean techniques or principles of command and control which may be applicable to such operations today in Europe is not only appropriate, but necessary to determine effectiveness of command and control capabilities today.

Section III Historical Foundation

When at last...the will-to-live of the German nation instead of continuing to be wasted away in purely passive defense, can be summoned together for a final, active showdown with France, and thrown into this in one last decisive battle with the very highest objectives for Germany; then, and only then, will it be possible to bring to a close the perpetual and so fruitless struggle between ourselves and France.²⁰

Adolph Hitler, Mein Kampf (1925)

A casual student of history learns early a lesson verified with such regularity that one can scarcely appreciate its simplicity. That lesson is that feats determined to be impossible by contemporary wisdom often can be accomplished by individuals with a unique combination of leadership ability, training, and, perhaps most importantly, the proper mindset. In no profession is this more evident than in the profession of arms. General George Marshall in his Memoirs of My Service in the World War describes this idea with earthy simplicity:

... but war is a ruthless taskmaster, demanding success regardless of confusion, shortness of time, and paucity of tools. Exact justice for the individual and a careful consideration of his rights is quite impossible. One man sacrifices his life on the battlefield and another sacrifices his reputation elsewhere, both in the same cause. The hurly-burly of the conflict does not permit commanders to draw fine distinctions; to succeed, they must demand results, close their ears to excuses, and drive subordinates beyond what would ordinarily be considered the limit of human capacity. Wars are won by the side that accomplishes the impossible. Battles are decided in favor of the troops whose bravery, fortitude, and especially, whose endurance, surpasses that of the enemy; the army with the highest breaking point wins the decision.²¹

At the time, General Marshall, a young colonel, was a member of the American Expeditionary Force (AEF) under command of General Pershing. One of the most challenging assignments he was given as G3 was the task of concentrating the First Army, AEF, for the Meuse-Argonne Operation.

The plan was developed prior to the forces taking part in the reduction of the Saint Mihiel salient and involved significant changes in task organizations, troop movements perpendicular to established supply routes, extensive allied coordination, and time constraints. This was all to be accomplished by an AEF new to the theater and grand scale continental war. General Marshall developed the concepts and warning orders within the short span of twenty-four hours. In his opinion, it "...represented my best contribution to the war. It was the only official paper I preserved for my personal records and brought home from France."²² General Marshall's Memorandum for Record outlining the concept and scope of the operation is shown on page 39.

General George Patton's maneuver of III Corps into position at the Battle of the Bulge in December 1944 is probably the most familiar example of operational maneuver in U.S. Army history. To place this task in context, it is necessary to recall that the Third U.S. Army had been enjoying great success as it moved across northern France after the Normandy breakout. The disposition of the Third U.S. Army on 17 December 1944, is illustrated on page 40. Patton was preparing to continue his attack into the German West Wall fortifications with the U.S. XX and XII Corps on line and the U.S. III Corps closing in the center.

The Germans unleashed an attack through the Ardennes sector on the 16th of December. This attack, while initially undetected, enjoyed early success through the thinly held U.S. First Army positions. General Bradley, Commander of the 12th Army Group, ordered Patton to release control of the 10th Armored Division to the adjoining VIII Corps

on Patton's northern flank. Patton complied with this order reluctantly on the 17th of December.

Having sensed the gravity of the developing situation in First U.S. Army, Patton had already alerted General Millikin, Commander of III Corps, to plan for a possible attack to the north if the German offensive continued. Additionally, Patton ordered his Army staff to begin planning as well. Routes were identified and control responsibilities assigned to supporting Military Police battalions on the 17th of December.

By the 18th of December General Bradley asked Patton what he could do to help slow the German offensive. At this Patton offered the three divisions (4th Armored, 26th Infantry, and the 80th Infantry) and III Corps headquarters in a move north to attack. With Bradley's concurrence Patton alerted his staff to begin planning and repositioned the 4th Armored and the 80th Infantry to move north. His G3 began developing counterattack plans while his G4 began to plan the shifting of the required logistics to the north. Bradley gave the execution order at 2000 hours on the 18th of December. III Corps headquarters began moving and closed on Arlon on the 19th.

Patton's staff had identified four routes to be used during this move. The 4th Armored Division moved on routes A and B. The 80th Infantry Division moved on routes C and D. Later the 26th Infantry Division followed the 80th Infantry on route C. In summary, Patton moved three divisions, a corps headquarters and a large number of supporting assets over 100 miles and initiated a counterattack in three days.²³

The details of this move provide an appreciation of the scope of the effort. The Fourth Armored Division began moving on routes A and B at midnight, 18-19 December. Combat Command B followed by divisional headquarters and Combat Command A moved on route B. The division trains moved on route A. Combat Command R and the 704th Tank Destroyer Battalion moved on the 20th. The three convoys on route B included approximately 780 wheeled and 685 tracked vehicles. These three convoys occupied 185 kilometers of road space. Since the march distance from the start point to the furthestmost destination was only 192 kilometers, Combat Command B reached its final assembly area just as Combat Command A was clearing the starting point. Closure time (pass time) for the convoys on route B was slightly over 7 1/2 hours. March time for these convoys was approximately 5 1/2 hours at daytime speed and 10 1/2 hours at night speed (incl time for breaks). This column of three convoys moved 1,465 vehicles over 181 kilometers in 26 1/2 hours during a march that started under night conditions and transitioned into day. Altogether, the 4th Armored Division moved approximately 2,500 vehicles on routes A and B on 19 and 20 December.

The 80th Infantry Division moved to an assembly area north of Luxembourg beginning the morning of 19 December. Moving approximately 2,265 vehicles on routes C and D in daytime over 120 kilometers required a march time of 4 hours (incl breaks). Closure time for each of the two columns was 6 hours. The 80th Infantry Division closed on 20 December.

On the morning of 20 December, the 26 Infantry Division was in an assembly area near Metz configured roughly the same as the 80th Division. The 26th Infantry moved to an assembly area north of Arlon.

Moving on two routes (C and D) in daytime, the unit covered 85 kilometers in 2 3/4 hours. Although the planned march time was 9 hours, the Division closed in its assembly area in only 6 hours.

In addition to the three divisions with their attachments, numerous army assets assigned to III Corps also moved north from 19-20 December. Perhaps the most impressive move made by any formation was that of the corps artillery. These units were in support assignments on the 19th, formed to march and reformed to support attacking forces in the north by 0600 hours on the 22nd of December. They moved a total of 870 wheeled vehicles and 252 tracked artillery vehicles in all.

The Third Army After Action Report states that 11,800 vehicles (roughly 9,000 belonged to III Corps) moved north over the four routes during this period. It is noteworthy that this large move was initiated rapidly using verbal orders later backed up by brief written orders. The Third Army operational directive for the move north was only one page and was dated 20 December, well after the move was already underway. III Corps Headquarters, itself moving north, issued no written orders until the attack order. The only division to issue a formal march order for the move appears to have been the 4th Armored Division, which issued a one page order on 19 December.

There are other examples of operational moves by American units such as the U.S. II Corps in North Africa in the Spring of 1943, however, the complexity of such moves is obvious. The examples shown illustrate the importance of leadership element in exercising command and control to accomplish military feats which at first may seem impossible.

Indeed, the situation the U.S. Army finds itself facing in Central Europe today may well be such that the operational moving and maneuvering of forces presents the best chance of successful conduct of the Airland Battle in the next war. At this point, three of what may be the most probable operational scenarios in the next war will be reviewed for command and control implications and the probability of the success of such operations today.

Section IV Operational Movement in Europe Today

Those states which failed to concentrate and deploy their main forces in peacetime found themselves in a very serious position. They proved unable to oppose the enemy in the first days of the war on the main axes of his advance with sufficiently powerful forces, nor could they beat off his massed surprise attacks from the air delivered at the war's outset, nor could they prevent the deep penetration of his ground forces into their own territory. This made it extraordinarily difficult for them to complete the strategic deployment of their own armed forces, because this had to be done simultaneously with the waging of difficult defensive battles.²⁴

General S.P. Ivanov, "Nachal'nyi Period Voiny"
(Voenizdat, 1974)

The great bulk of Soviet and Warsaw Pact military resources is deployed in or immediately facing the European theater. The Warsaw Pact surpasses NATO in strategic nuclear, tactical nuclear and conventional forces. Although WP conventional forces have historically outnumbered NATO, WP modernization programs threaten to overcome NATO's longstanding advantage in force quality. In the final analysis, it is the Soviet assessment of the relative NATO/Pact force preparations, the confidence in their ability to preempt NATO's use of nuclear weapons, as well as the risks and consequences of nuclear escalation that will be a critical factor in any Soviet decision to initiate conventional conflict.²⁵

The primary mission of the U.S. Army, as a member of the NATO Alliance, is to serve as a credible strategic deterrent land force against any Soviet/WP incursion into Western Europe. Should deterrence fail, the Army must respond with lethal effectiveness to delay, disrupt or destroy the attacking forces by all means necessary. Combat actions must assure the Soviets are subjected to heavy, continuing and increasing losses with no certainty of success and with rapidly escalating threat to the aggressor's rear areas and to his homeland.

Forward deployed forces and those reinforcing forces in response to Warsaw Pact aggression must be highly trained in all aspects of maneuver warfare--from fighting in built-up areas to fighting in open terrain. In fact, just as it was necessary to conduct large scale operational movements and maneuver of Corps and Echelons Above Corps in World War II and Korea, it can be expected that such movements and maneuvers will be necessary to better match forces to the threat in Europe in the next war.

For the purposes of studying the capability of the U.S. Army corps, including its interface with higher echelons, to provide effective command and control of forces and elements conducting operational level movement and maneuver, the following representative cases span the realm of possibility and provide a basis for analysis:

- 1) A U.S. Army Corps in the Central Army Group releases its committed units to adjacent Corps, assembles and moves uncommitted forces to the Northern Army Group area for commitment against a WARSAW Pact penetration in the North German Plain. See the illustration on page 41.

- 2) A U.S. Army Corps in the Central Army Group is relieved after being passed through by attacking forces and subsequently moves its forces to the Northern Army Group for commitment against a WARSAW Pact penetration in the North German Plain. See the illustration on page 42.

- 3) A U.S. Army Corps in the Central Army Group in a relatively inactive sector generates a second command and control

structure to provide command and control for forces left in and economy of force defense while the Corps attacks across corps boundaries with uncommitted forces to destroy enemy forces and subsequently assumes responsibility for the resulting sector. See the illustration on page 43.

What follows are thumbnail sketches of probable scenarios. The resulting significant considerations involved in each of the operational cases are reviewed from a battlefield operating system perspective with special emphasis on the components of the U.S. Army Corps command and control system.

Case 1 involves the release of two in-place divisions and an armored cavalry regiment to adjacent corps with the original X Corps sector divided between the remaining corps. X Corps moves over four roads and two rail routes into NORTHAG and occupy an assembly area. Subsequently, the corps will move, deploy, execute a forward passage of lines through a corps, attack the flank of and reduce an assumed salient. See the illustration on page 44.

It can be expected that such a move will take approximately five to six days to plan, organize, and execute. This includes the time for the German Territorial Command to identify the road and rail routes as well as marshalling the rail assets. Additionally, another one to two days will be required for the corps to move, deploy, and execute the forward passage of lines. The total time required from the initiation of the move until the corps crosses the Line of Departure can be expected to be eight to ten days.

Radio listening silence can be expected to be in effect during the move with command and control executed using the in-place systems of the German Territorial Command and the Army Groups' common communications networks. The intent will be to monitor unit movements and execute command and control as required using existing or fixed systems.

Some intratheater airlift can be expected to be available and can be used to transport low density, low weight critical assets. Not enough airlift can be expected to be available to materially affect the movement of the main forces. Significantly, the use of a large number of transport aircraft would be difficult to conceal.

Logistics support can be expected to be a major factor during the move as well as when the corps is operating in the NORTHAG area. Support for the corps during the move ideally should be provided from theater sources in order to ensure the corps has resources to provide for itself in and during the counterattack. Significantly, there is currently no U.S. logistics structure in NORTHAG. Theater and Army Group must take action to address and resolve this problem. Because logistics is a national responsibility a portion of the corps assets must remain in the Central Army Group area to provide for the U.S. forces remaining in contact.

Air defense of the corps is essential because of the size of the moving force and the time required for the operational move to take place. The actual move is of special concern as the corps will be behind the high altitude air defense belt and the corps has no organic air defense assets other than that which belongs to the divisions.

When the corps Military Intelligence Brigade moves, the U.S. support available to CENTAG will be automatically reduced by one half. Allied intelligence resources, which are deliberately structured not to duplicate existing U.S. capabilities, are consequently not as robust thereby leaving the Army Group with a significantly reduced capability. Intelligence links with the remaining U.S. Divisional Combat Intelligence Battalions will be disrupted until new links can be established with adjacent corps.

Space will be a major concern in the NORTHAG area. The arriving corps will require an assembly area approximately 70 kilometers in diameter with 8-16 routes necessary to conduct the move and passage of lines enroute to the counterattack. The corps assembly area and routes will cross in-place corps rear and logistics areas. Thus, space management will be a significant NORTHAG requirement.

The current command and control system of a U.S. Army corps has sufficient capability in each of the three major components (organization, process, and facilities) to successfully execute the operational move required by Case 1. Command and control issues in this case relate primarily to training. Such issues as time/speed considerations, rules of engagement, CEOI/encryption tables, maps/SOP's, communications systems links, and deception planning can be expected to surface as recurring refinement issues in every subsequent operation plan exercise After Action Review. The bottom line in command and control remains simplicity and vigorous execution.

The FM 100-5 (May 86) imperative that "the command and control system which supports the execution of Airland Battle must facilitate

freedom to operate, delegation of authority, and leadership from any critical point on the battlefield²⁶, clearly emphasizes the importance of the system by which all other operating systems are managed. The components of a command and control system are equally important in the task of planning, directing, coordinating operations as well as management of other operating systems.

In the execution of the operational move in Case 1, several basic concepts are critical to a successful execution of command and control. A developed operations plan can be expected to yield many of the command and staff advantages that sustained combat operations normally produce in terms of SOPs and validated interpretations of the commander's intent. The current three tiered command post system (Tactical, Main, and Rear) supports the command and control mobility required in an operational move such as that in Case 1. Normal corps communications must be simulated in the old corps sector throughout the operation. However, corps units must operate on radio listening silence during the actual move. The liaison officer teams are critical elements in the exercise of command and control in the potentially fast paced, coordination intensive operational move in Case 1. Current NATO Standardization Agreements adequately provide for the personnel and communications requirements necessary for such coordination. See the illustration on page 45.

With the additional liaison and communications requirements resulting from an intratheater move there will be some potential equipment and personnel shortages which can be expected to affect the efficiency with which Case 1 can be executed. Currently, there are

shortages of liaison officers and equipment. US/Allied communications in the AM secure mode has compatibility problems. However, the introduction of Mobile Subscriber Equipment at corps level and below can be expected to generally simplify communications as well as enhance the electromagnetic deception effort at every level within the corps. See the illustration on page 44.

It must be assumed that the enemy will detect and target the corps move. The focus of deception efforts must be to delay that detection, to preclude the identification of the U.S. corps as the moving entity, and to delay his learning the objective of the move. The desired result of an effective deception effort would be that the enemy would learn of the move too late to divert resources to take advantage of the weakened sector or to target the moving corps.

Case 2 involves the passage of another force of equivalent size through a U.S. Army corps to conduct a limited objective attack in sector under Central Army Group control. Upon completion of the attack, the other force, which for purposes of discussion will be the First French Army, returns to CENTAG reserve. The U.S. corps withdraws upon passage of the attacking force and moves by road and rail to NORTHAG where it executes a forward passage of lines and attack into a salient of an assumed penetration. Adjacent corps boundaries are then adjusted to provide command and control of reinforcing NATO forces assuming defense of the sector. Again, the operational movement of the U.S. corps is supported by Theater and German Territorial Forces as was the corps in Case 1.

The entire operation in Case 2 can be expected to take approximately seven to ten days to complete. This includes one to two days for planning, two days to complete the passage, three to five days for the road march into NORTHAG, and one day for the corps to move to the Line of Departure for the subsequent counterattack.

Although Lines of Communication maintenance is a normal engineer task, it will be especially important in this case. The high concentration of French equipment coming into the corps sector coupled with the withdrawal of U.S. equipment, causes maintenance of the road network to be critical to the timeliness and ultimate success of the entire operation.

With the introduction of another allied force, such as the French Army, normal interoperability problems can be expected to increase. Potential problems include language difficulties, incompatibility of communications equipment, variations in doctrine, obstacle handoff, etc. One area in particular, that must be orchestrated carefully is the transfer of intelligence operations.

Of particular significance in Case 2 is the absolute necessity of a viable deception plan that supports both the passage of the French force and the movement of the U.S. corps into NORTHAG. The deception plan must delay the Soviet detection of the passage by the French and then disguise the size and the ultimate goal of the unit moving. To assist in delaying the detection of the movement, the U.S. corps must leave some U.S. electronic emitters such as TACFIRE in their old sector for a period of time to maintain the appearance of a continuing U.S. presence.

As in Case 1, the current command and control system of a U.S. Army corps in Europe has sufficient capability in each of its three major components to successfully execute the friendly passage, the U.S. withdrawal, and operational move required by Case 2. As in Case 1, command and control issues relate primarily to training. Such issues as time/speed considerations, rules of engagement, CEOI/encryption table, maps/SOP's, communications links, and deception planning remain critical. The introduction of the French Army into the equation significantly increases the liaison officer and related equipment requirements. The fact that a corps level passage is to take place significantly increases the risk of detection and subsequent targeting by Soviet forces. The success of his operation hinges on a number of related areas, but basic to them all is a well rehearsed operation plan.²⁶

The components of a command and control system are every bit as important and critical in Case 2 as in Case 1. The fact that the interoperability problem is compounded by the conduct of the passage by the First French Army is significant as this introduces a third allied party into the consideration. The liaison officer and communications requirements are the same as currently required by NATO Standardization Agreements. However, the personnel and equipment requirement essentially doubles for the U.S. corps because of the addition of the attacking French Army into the operation. U.S. and Allied doctrine for relief and passage operations is well founded. While the principles of relief and passage of lines operations have remained relatively unchanged since World War II, the techniques involved have been

continually refined both with and without Allied cooperation. In Case 2 it can be expected that the French and the U.S. conduct relief and passage operations essentially the same way.

Deception is particularly critical for success of an operation involving a unit passing through to attack. The risk to the forces involved is essentially doubled because of stresses on command and control and the concentration of units necessary to conduct the passage. The deception operation in support of the U.S. corps operational move may be facilitated by the introduction of French forces. While the French government has formally removed its forces from the NATO military structure, it has continued to cooperate militarily with NATO forces. This arrangement necessarily results in strict limits on NATO use of French forces. Because of the French political position against subordination of its forces in static defensive roles outside France's National boundaries, doctrine and force structure has resulted which is optimized for the conduct of short duration offensive operations, such as counter attacks and other mobile strike operations.²⁷ The objective of deception planning for Case 2 remains the same as in Case 1 with the additional intent to delay the discovery of the French involvement and mission. In this case, both a well developed and rehearsed operations plan, as well as bilingual liaison officers will be critical to successful command and control of the forces involved.

The normal three tiered U.S. command post system and its Mobile Subscriber Equipment communications can be expected to facilitate the deception, passage, withdraw, and move. The same concerns with regard to liaison equipment and personnel shortages in Case 1 apply to Case 2.

Case 3 is distinctly different from Cases 1 and 2 in several respects. Most notably, it is based on a tactical requirement for another corps and involves a corps in a relatively inactive sector. The enemy situation is such that the Allied defense is holding in NORTHAG and most of CENTAG except where a penetration of the northern U.S. corps sector has been effected by three Warsaw Pact combined arms armies. Thus, the tactical situation necessitates another corps be generated to conduct a counter attack to eliminate enemy forces in the salient. The scenario is that the relatively inactive southern U.S. corps would generate another corps while continuing to defend in sector as an economy of force mission, conduct a counterattack into the northern U.S. corps sector, destroy enemy forces, and defend a resulting newly defined corps sector. See the illustration on page 47.

There are a number of possible solutions to generating another corps headquarters. The first of these and perhaps the least desirable is to split the corps headquarters evenly along day/night shift lines. This would ensure that all functional areas are covered, but because of personnel and equipment shortages, it would most certainly ensure the failure of the overall mission. The second solution would be to augment the Corps Tactical Command Post to give it more nearly the capability of a Corps Main Command Post. This solution would certainly work, as corps practice for the eventuality of a command post being destroyed and replaced routinely. However, there is a degradation of capability for managing either the near or deep battle, and in some cases, both. The last solution, and perhaps the most promising in this case, is to augment a subordinate unit headquarters for the economy of force mission

of conducting defense in the original corps sector. Sufficient personnel and equipment can be allocated to the provisional corps for the additional CENTAG communications and reporting functions. The preponderance of command and control personnel and other resources remain available to the original corps to ensure the best chance of success in the counterattack. The counterattack operation is assumed to be critical to the success of the Army Group defense. Thus, the use of an established corps chain of command and staff structure is highly desirable, as is Army Group level synchronization of the supporting air and ground battles.

While a current U.S. Army corps can perform each of the required operations in Case 3, the principal issue is the generation of another corps command and control structure. While a corps headquarters Table of Organization and Equipment does not provide for redundancy at the outset and the effects of battle attrition must be considered, a second headquarters can be generated. However, it must be understood that increased risk must be accepted with regard to the mission of both the resulting corps structures.

There are several supporting organizations which are not structured or resourced to be divided and, therefore, necessitate special consideration. The Air Support Operations Center (ASOC) may remain with the Provisional corps or move with the attacking corps. Regardless, it must support both corps until a second ASOC can be generated by the Air Force. The corps Tactical Air Control Party can perform ASOC functions for a limited period of time. Corps Artillery functions necessary in the Provisional corps must be performed by an augmented Field Artillery

Brigade Tactical Operations Center. The attacking corps must be supported with intelligence primarily by the Military Intelligence (MI) Brigade belonging to the northern U.S. Corps. The MI Brigade supporting the southern U.S. corps must continue to support the Provisional corps in the economy of force sector, but may provide some intelligence support to the attacking corps also. Both the attacking and Provisional corps will have to be supported from the same logistical base. This must occur until a second computer is available, storage points can be stocked and transferred, and finally, until a second Material Management Center can be activated.

Time and space considerations can have a major impact on planning and execution of the operation in Case 3. This is especially true since corps boundaries must be crossed and critical intelligence, logistics, and air operations must be coordinated between corps. As the counterattack is the central focus and indeed, the critical operation in sector, the Army Group must synchronize the supporting air and ground campaigns to defeat the penetrating enemy force and to prevent its being reinforced. Finally, the estimated or "best case" time of four days to plan, position, and execute the counterattack, as well as the fifteen to twenty kilometer area and four to eight routes required per division in preparation, emphasize the vulnerability of the counterattacking force throughout.

A deception plan must be designed to cause the enemy commander to continue his operation as though a counterattack was not imminent. Both an operations plan and a concurrent deception plan should be initiated at Army Group level to provide the basis for refinement exercises and

SOP revision in the absence of the pressures of actual combat and to facilitate operations once combat becomes a reality.

As in Cases 1 and 2 the command and control system of a U.S. Army corps in Europe has sufficient capability in each of its three major components to execute the required functions in Case 3. However, to successfully execute the requirement to generate a new corps structure, concentrate forces, conduct a friendly passage of lines, conduct a main and supporting attack, consolidate, and assume responsibility for the resulting area, considerable augmentation of both personnel and equipment is necessary for sustainment of long term operations.

In Cases 1 and 2 the command and control issues relate primarily to training. In Case 3 the command and control issues relate mainly to equipment and personnel availability and the capability to conduct sustained operations. Such issues as time/speed considerations, rules of engagement, CEOI/encryption tables, maps/SOPs, communications links, and deception planning remain critical as in each of the other cases. The success of the operation in Case 3 rests on a number of related areas, but basic to them all is a well rehearsed operations plan in peacetime.

While the components of a command and control system are important in Cases 1 and 2, they are essential in Case 3. In Case 3, the unit is not only moving to and preparing for a combat operation, it actually conducts offensive tactical operations using only those forces available within the Army Group sector.

The generation of a new corps structure from an existing one which is actively conducting defensive operations presents unique challenges

to the command and control system at nearly every level. The first is the determination of how the new corps command posts will be generated. Several feasible options are available, including augmenting the Tactical CP to give it more of the capability of the Main CP, augmenting a subordinate unit headquarters to perform routine higher headquarters functions, or dividing the original corps command post structure along day/night shift line. Because of the critical nature of the intended counterattack to the Army Group defense, the preponderance of command and control probably should be in the attacking corps. Thus, the augmentation of a subordinate headquarters is probably the most desirable option.

It must be stressed that neither the original nor the generated corps will be as robust or capable of extended combat operations as the original undivided corps. Concentration of forces, friendly passage of lines, supporting and main attacks, and consolidation of a new sector are all operations supported by current U.S. Army doctrine. The austere command and control structure resulting from a split of possibly battle depleted resources requires the assumption of some risk in both corps structures, but particularly in the provisional corps.

Deception is critical as always and is essential to conceal the fact that a new corps structure has been created and to conceal the mission of the corps. Interoperability is important and may take on new relevance in the objective area as a result of encircled enemy forces and the effect of combat on civilians. The normal three tiered command post system and its Mobile Subscriber Equipment communications can be expected to facilitate the operation.

No military force ever behaves entirely according to plan. The difference between the plan and the actual events grows as combat occurs and increases as the tempo of combat increases. At the operational level it is important to consider what will logically occur during the next phases of the campaign plan. The sequencing of phases and the planning for branches and sequels from the primary plan must be a normal part of the operational level planning process. While admittedly the three cases discussed are not all inclusive, they represent a sufficiently broad range of probability that they could be the basis of detailed operational planning now. Operational planning is difficult. However, execution is even more difficult, especially by units of an army which has not had to conduct such operations in over forty years. Exercises based on likely plans have proved to be effective substitutes for actual operations in war.

Section V
Conclusions and Implications

There is only one principle of war and
that's this: Hit the other fellow
as quick as you can, as hard as you can,
where it hurts him the most,
when he ain't lookin' ²⁸

Sandhurst RSM to William Slim,
Defeat Into Victory

It is the mission of the theater commander to create a favorable battle situation, defeat the enemy force as quickly as possible, and eliminate future threats to his force within his capability. In almost every modern war, theater mobility of large units has proved to be of great importance in accomplishing these three objectives. Such movements as those conducted by the American Expeditionary Force in World War I and by the Third U.S. Army in World War II are particularly instructive for operational moves of today. For although there have been advances in mobility and command and control facilities, there have been other significant changes negating those advances. Such unpredictable developments as population growth and urbanization of the traditional avenues of approach have caused many of the factors important to operational movement to remain the same or even to deteriorate. Thus, while the force design of World War I and World War II U.S. Army corps have changed when compared to today's U.S. Army corps, the basic lessons remain valid. Training and the will to achieve success coupled with bold leadership, make operational movement a viable option today.

Analysis of three possible scenarios involving operational movement and maneuver of a U.S. Army corps in Europe suggests that intratheater movement of large forces is feasible. However, there are significant

problems that must be addressed and resolved for it to be possible in combat without the unnecessary loss of life, destruction of equipment, and the waste of equally precious time.

A primary prerequisite for operational movement today is the control of the airspace over the maneuver area. In Cases 1 and 2, the U.S. Army corps have to move behind the Forward Combat Zone to minimize the impact on the front line corps. However, this would place them behind the High Altitude Medium Air Defense (HIMAD) coverage of the Forward Missile Engagement Zone and in front of the Rear Missile Engagement Zone. U.S. Army corps do not have organic HIMAD assets and while maneuvering in the gap between the coverage zones will be at significant risk.

Movements over the considerable distances indicated in Cases 1 and 2 require significant logistical support external to the assets of the maneuvering corps. Requisite to this support is a secure Rear Combat Zone. The purpose of the operational movement is to reposition large forces to deal with threats in other areas. Therefore, it is highly desirable that these forces arrive in the objective area on time and with its combat power intact in order to be immediately available for commitment to the critical battle. Such movements divert significant amounts of theater services and transport. Fuel, transportation coordination, land management, route planning, and relocation of logistics stocks all require the support of theater assets. The corps being moved will arrive as a more viable combat force if theater support is provided for the move.

Redeploying a corps affects all other combat operations in the theater by saturation of routes and disruption of air/counter air operations. However, underlying such movement is the assumption that it is important enough to demand high priority from the theater commander. In this situation, Central Army Group must adjust priorities for air operations before and during the movement to protect the maneuvering force. The resulting degradation of ongoing operations must be a major operational planning consideration. Daily logistics flow, replacements, reinforcing units, and casualty evacuation for the Forward Combat Zone is perpendicular to the south to north movement of the operational maneuvering force in Cases 1 and 2. The potential disruption effect of such repositioning, particularly prior to D+10 is a major planning consideration because of the heavy volume of reinforcement traffic on the west to east routes. Coordination with the German Territorial Forces Command for Rear Combat Zone management is required and priorities must be adjusted accordingly.

Anticipating requirements to exercise inherently high risk operational maneuver places significant demands on the intelligence community. Operational commanders need sound projections of enemy capabilities and probable courses of action in order to make the necessary timely decisions to target enemy sensors, ground control facilities, and long range fire systems during the movement of friendly forces. Operational maneuver must be supported by detailed Army Group level deception plans. Enemy commanders at various levels must be targeted at specific times to generate the uncertainty necessary to delay their discovery of the operational move and subsequently making

adjustments to negate its effect or worse, exploiting the resulting local weaknesses.

Theater, Army Group, and Corps commanders need to conduct extensive training of staffs and subordinate units in the conduct of operational movements. Exercise programs need to be implemented to develop and refine SOPs and procedures to facilitate the conduct of operational movement under the stress of combat. March planning, associated logistical support, and detailed coordination with the German Territorial Forces Command and National rail authorities require continued and increasingly sophisticated practice. Existing exercises should be augmented to ensure that Corps Main Tactical Command Posts remain operational during moves, that mobility assets are identified for each Command Post cell, that automation and communications equipment are identified to allow continuous operations during planned moves, that SOPs are developed for dispersed Command Post Operations, and that intensive use is made of officer/NCO liaison teams that are manned with planners and equipped with communications and transportation assets to enable them to perform doctrinal/STANAG responsibilities. Exercises must be used as vehicles to identify and correct system and procedural weaknesses. Training and organizational changes must be driven by lessons learned from realistic and imaginative exercises.

For operational movement to occur between the Central and Northern Army Groups, the Theater Commander must function as the operational level commander. Forces moving between Army Groups, air operations which require synchronization dictate that all levels of

National responsibilities and capabilities, particularly logistics and intelligence be centrally controlled for timely, meaningful operational movement. This challenges the present NATO deliniation of "National responsibility"; however, the change in organization at theater level to facilitate these functions being performed on an area basis would result in a significant improvement in operational movement capability of corps level formations.

While the challenge to operational movement today at Echelons Above Corps is primarily the management of support, the challenge at corps and below is that and more. The U.S. Army corps has been developed as the highest tactical unit of the U.S. Army charged with the execution of the Army Airland Battle doctrine as explained in its basic tenets of initiative, agility, depth, and synchronization. These tenets or characteristics of successful military operations place great demands on the command and control system. The measurement of effectiveness of the U.S. Army corps command and control system today, when analyzed in terms of its components, reveals a situation in which there is some room for encouragement, but also significant room for alarm. Specifically, current tables of organization and equipment need to be expanded to allow for staff augmentation which will enable continuous operation of Command Posts during moves; additional liaison teams to facilitate the increased communication and coordination requirements of operational movements; and additional organic transportation to provide for Command Post cell mobility.

A review of the components of command and control reveals that a C² organization consisting of the commander and staff, is effectively

manned to provide command and control for the stationary defense which the U.S. Army has assumed to characterize the next war for nearly 40 years. However, the demands of operational movement, including increased numbers of liaison officers and the possibility of splitting headquarters while maintaining the capability to fight the rear, close, and deep sustained battles seriously exceed current capabilities.

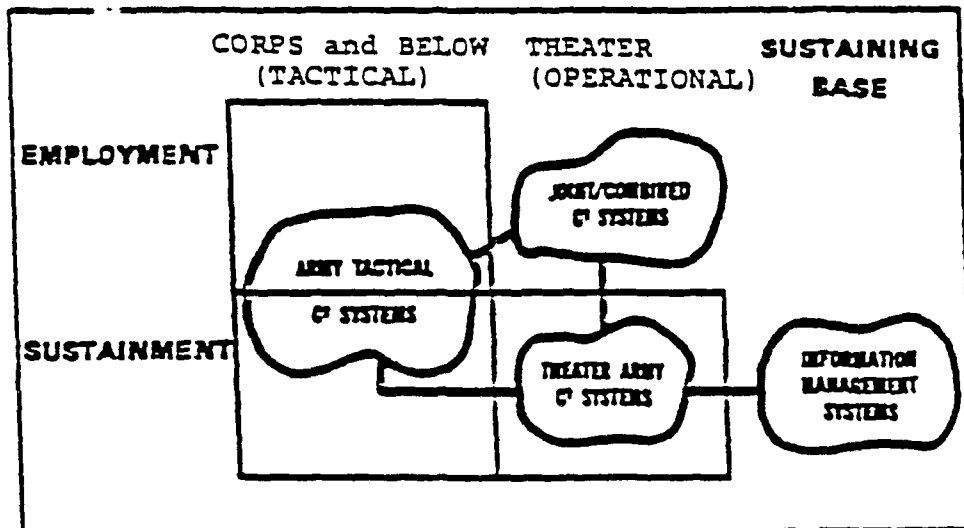
A review of the C² process component of the command and control system which includes planning, coordinating, directing, and controlling reveals that the capability for comprehensive and continuous planning for operational level movement and maneuver exists now. However, standard practices and procedures and rehearsed responses to operational contingencies do not. As it cannot be expected that time will be available in the beginning of the next war for learning to take place in these vital areas, plans must be developed and exercised now.

A review of the C² facilities component of the command and control system which includes command posts and communications systems reveals that the capability for rapid and economical communication of information and orders exists. However, as one Israeli general said, "The problem is not so much providing information in 'real time', but of 'getting the real information in time'²⁹. This is a subtle distinction, but it points out the problem. The current command post structure of the U.S. Army corps is so austere manned and equipped that it is questionable that sufficient numbers of properly qualified and equipped liaison officers can be made available to meet the need for operational movement. The current command post system is so austere manned that such an activity as splitting a headquarters to generate

another command and control structure would raise the risk to the resulting organizations sufficiently as to question the validity of the concept. The bright spot in facilities seems to be the communications systems. Once the Mobile Subscriber Equipment is completely fielded and tested, communications systems should not be a hindrance to operational movement. However, sufficient amounts of equipment may.

In conclusion, sophisticated new technology and vastly increased firepower may mean that future battles in Europe are likely to be more intense and of greater scope, so that they begin to acquire a different character from those of the past. However, the lesson from the past that operational maneuver is essential to effective use of combat power remains true. In order for today's U.S. Army corps to effectively meet the requirement for operational level warfare, many adjustments must be made at Echelons Above Corps, but significant improvements must be made to the U.S. Army corps command and control system today.

Illustration 1
The Tactical Command and Control System



COMMAND AND CONTROL

GOVERNING DOCTRINAL PRINCIPLE:

MAXIMUM SUBORDINATE FREEDOM OF ACTION WITHIN THE SCOPE OF THE COMMANDER'S INTENT.

Illustration 2
General Marshall's Memorandum for Record

Souilly, November 19, 1918

MEMORANDUM FOR: 1st Subsector

1. About September 8, General Hugh A. Drum had a conference regarding preparation for the Argonne Operation. At the conclusion of the conference he directed that Col. Monroe C. Kerth take charge of the billeting of divisions arriving on the Argonne front, that Col. Walter S. Grant take charge of the arrangements for taking over command from the French Second Army, of the Argonne front, and that I take charge of the movement of the forces from the St-Mihiel Operation into the zone of the French Second Army --- that is, Northwest of the line Benoitvaux---Pierrefitte---Maives-devant-Bar.

2. As a preliminary step towards carrying out the movement of the troops, a memorandum was prepared and issued on September 19, Subject: "Reliefs and Readjustments of Units following Reduction of the St-Mihiel Salient." This memorandum arranged for the relief of certain army corps, artillery brigades and divisions, on specified days following 8 day, after the St-Mihiel attack. It designated their assembly points from which they were to be moved to the Argonne front.

While these movements were planned in advance of the battle and covered troops who were to be engaged in the first line of the battle, it developed later that it was possible to carry them out exactly as arranged.

3. In general there were three routes available for the movement of troops from the St-Mihiel front to the Argonne, viz:

(1) via Gironville---Mecrin---Rupt-devant-St-Mihiel---Pierrefitte.

(2) via Trondree---Vertuzey---Commercy---Menil-aux-Bois and Pierrefitte or Lavelle---Maives.

(3) via Toul---Void---Ligny---Bar-le-Duc.

The road from Aprmont to St-Mihiel was in the hands of the enemy at the time the first plans for the movement were made and it was not known whether or not it would be passable after control of it had been gained. It proved to be impassable until the movement of the troops was completed.

The great difficulties in connection with these movements, aside from the uncertainty of knowing when any particular unit could be safely withdrawn from the St-Mihiel battle were:

1st---The movement of the troops across the rear zone of the corps engaged in the St-Mihiel battle during the period when all the roads were congested with the movement forward of ammunition, rations and engineer material. Units had to be moved from east of the Meuse across the corps zones.

2d---The limited number of roads available for the movement of the large mass of troops to be transferred to the Argonne front, coupled with the fact that all movements had to be executed entirely under the cover of darkness. The Toul---Void---Bar-le-Duc Road was the motor highway, and the other two roads were employed for the movement of the foot troops and the animal drawn vehicles, except in a few instances where tractor artillery had to be sent over to them.

4. The preparation of an ordinary march table for the movements of the troops was not practicable as it was never possible to know over twenty-four hours in advance just what units would be available to put in motion. The artillery brigades destined to be attached to 1st line divisions in the Argonne battle and a large number of French horse 75-mm. regiments were first put in march on the two roads available. The movement of certain reserve divisions by bus and marching was also started.

After initiating the above it became necessary to coordinate all further movements with the movements of the ammunition motor trains and the movements of French divisions being concentrated on the front of the French Fourth Army for the same operation. To accomplish this coordination I would propose each day to Capt. Gorju, C. R. A. [Army Regulating Commission] officer at Bar-le-Duc, the movements I wished carried out during the next forty-eight hours. He would then compare my proposal with the other movements in prospect and together we would arrive at an adjustment between the two. Based on this arrangement the orders would then be issued to the army corps in the First Army to start certain elements from designated points by designated routes.

To further complicate the problem there were a large number of French units serving in the First Army to be hurriedly transferred to the French Fourth Army.

5. The work of the troop movement officers on duty in the Section of the I and IV Corps was particularly fine because their problem was a most complicated one; to locate the troops and assemble them at the proper point and put them in march without interference with each other and in accordance with the Army schedules.

Some of the difficulties involved were the following: Trains could not be obtained for all of the tractor-drawn artillery. We were then confronted with the proposition of moving elements of units which could only travel 3 kilometers an hour while other elements of the same unit could travel 15 kilometers an hour.

Again some tractor artillery could travel 8 kilometers an hour while other portions of its train could travel 15 kilometers an hour.

Solid columns had to be placed on the roads, composed of elements of different divisions, different corps and different armies, all moving at the same time.

The arrangements for the command or the control of these columns were extremely difficult, where it could be arranged.

Camions scheduled to move divisional foot troops would be delayed in arriving at the embussing point, due to some blocks or checks in movement beyond our control, in the zone of the French Fourth Army, for example. The camions had to be used immediately as it was necessary to drive them to their maximum capacity. The resulting movement, taking place at other hours than these arranged for, caused unavoidable crossing of other columns, as it was necessary to route some horse transport via the Toul---Void---Ligny motor road.

Some of the animals in the artillery, both French and American, had become so worn down by the constant movements during the past month that it was very hard to force them through according to any ordinary schedule.

Frequently arrangement would be completed for the movement of certain artillery units, and at the last moment we would learn that some increased activity on the battlefield had made it impossible to withdraw them in time to take up the march. There were one or more instances where units withdrawing suffered such casualties among their horses that their entire schedule of movements had to be changed at the last moment.

The formation of the various columns was always seriously complicated by the necessity of putting certain troops on certain roads in order that they could be conveniently passed into their proper places on the Argonne front. For example, the I Corps units all had to be passed to the region of Les Islettes while units to be assigned to the III Corps were destined for the region just west of Verdun.

While it might have been much more practicable to route a I Corps unit by the northern road, it usually had to be placed on the most southern road in order to avoid crosscutting the columns headed north from the general vicinity of Bar-le-Duc, some of these coming from points south in the training areas.

6. When the various columns reached the line referred to in Par. 1 above, they were taken over by the French Second Army and routed north into their proper positions for the coming battle.

7. Despite the haste with which all the movements had to be carried out, the inexperience of most of the commanders in movements of such density, the condition of the animals and the limitations as to roads, the entire movement was carried out without a single element failing to reach its place on the date scheduled, which was, I understand, one day earlier than Marshall Foch considered possible.

G. C. Marshall, Jr.,
Colonel, General Staff
A. C. of S. G-3

Illustration 3
Third U.S. Army Dispositions on 17 Dec 1944

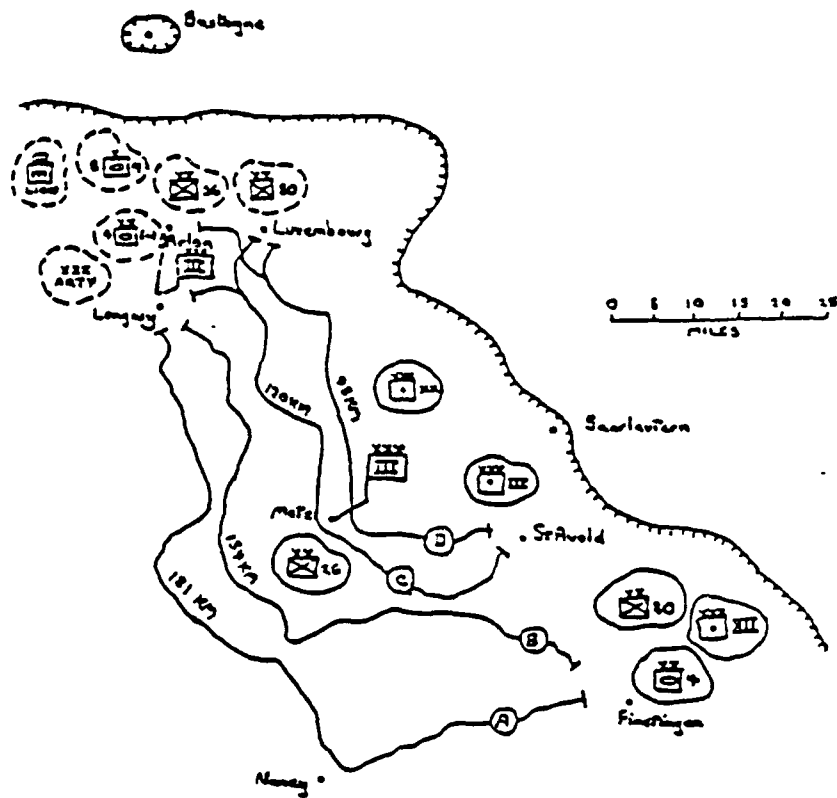


Illustration 4
Operational Corps Movement - Case 1

CASE I CONCEPT

- X CORPS RELEASES 2 DIVISIONS AND ACR TO ADJACENT CORPS.
- MOVES 1 DIVISION, 1 DIVISION(-) AND ACR NORTH.
- OCCUPY ASSEMBLY AREA IN NORTHAG.
- CONDUCT FORWARD PASSAGE OF LINES.
- ATTACK INTO SALIENT.

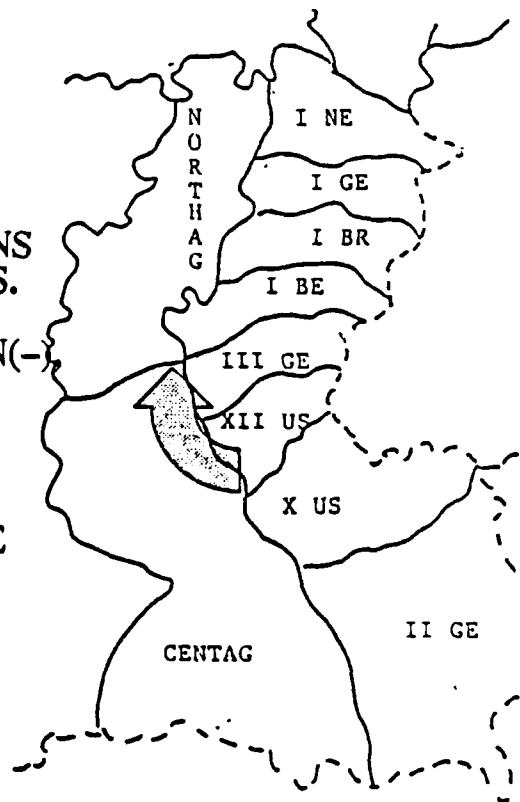


Illustration 5
Operational Corps Movement - Case 2

CASE II CONCEPT

- 1ST FRENCH ARMY RELIEVES XII CORPS IN PLACE.
- XII CORPS MOVES BY RAIL AND ROAD TO NORTHAG.
- OCCUPY ASSEMBLY AREA IN NORTHAG.
- CONDUCT FORWARD PASSAGE OF LINES.
- ATTACK INTO SALIENT.

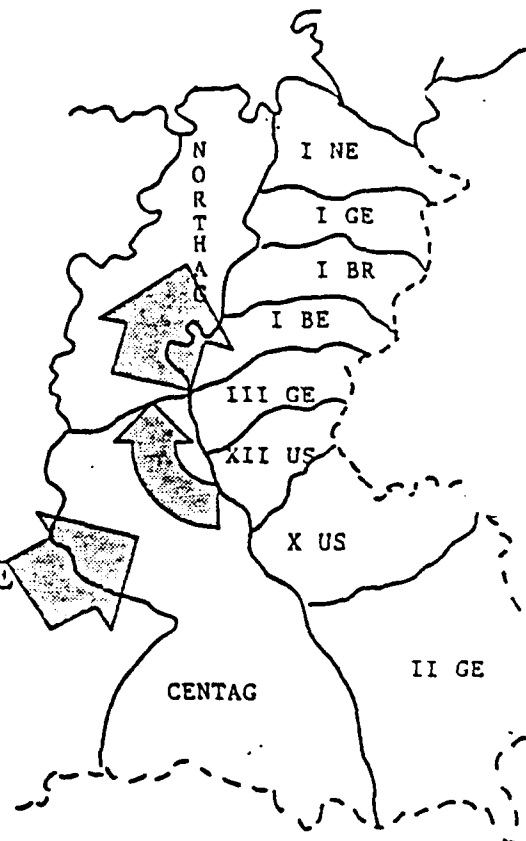


Illustration 6
Operational Corps Movement - Case 3

CASE III CONCEPT

- X CORPS GENERATES ADDITIONAL CORPS HQ.
- X CORPS (PROVISIONAL) DEFENDS IN ORIGINAL SECTOR.
- X CORPS COUNTERATTACKS TO DESTROY ENEMY FORCES IN XII CORPS SECTOR.
- X CORPS ASSUMES RESPONSIBILITY FOR NEW SECTOR.

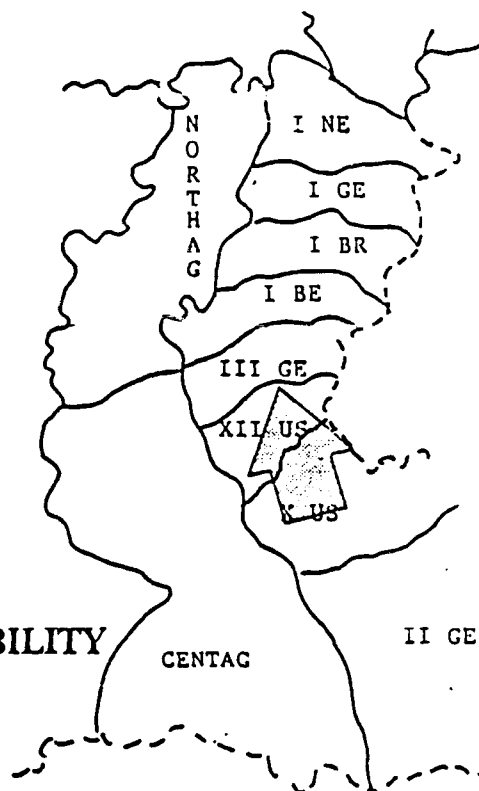


Illustration 7
Concept of the Operation - Case 1

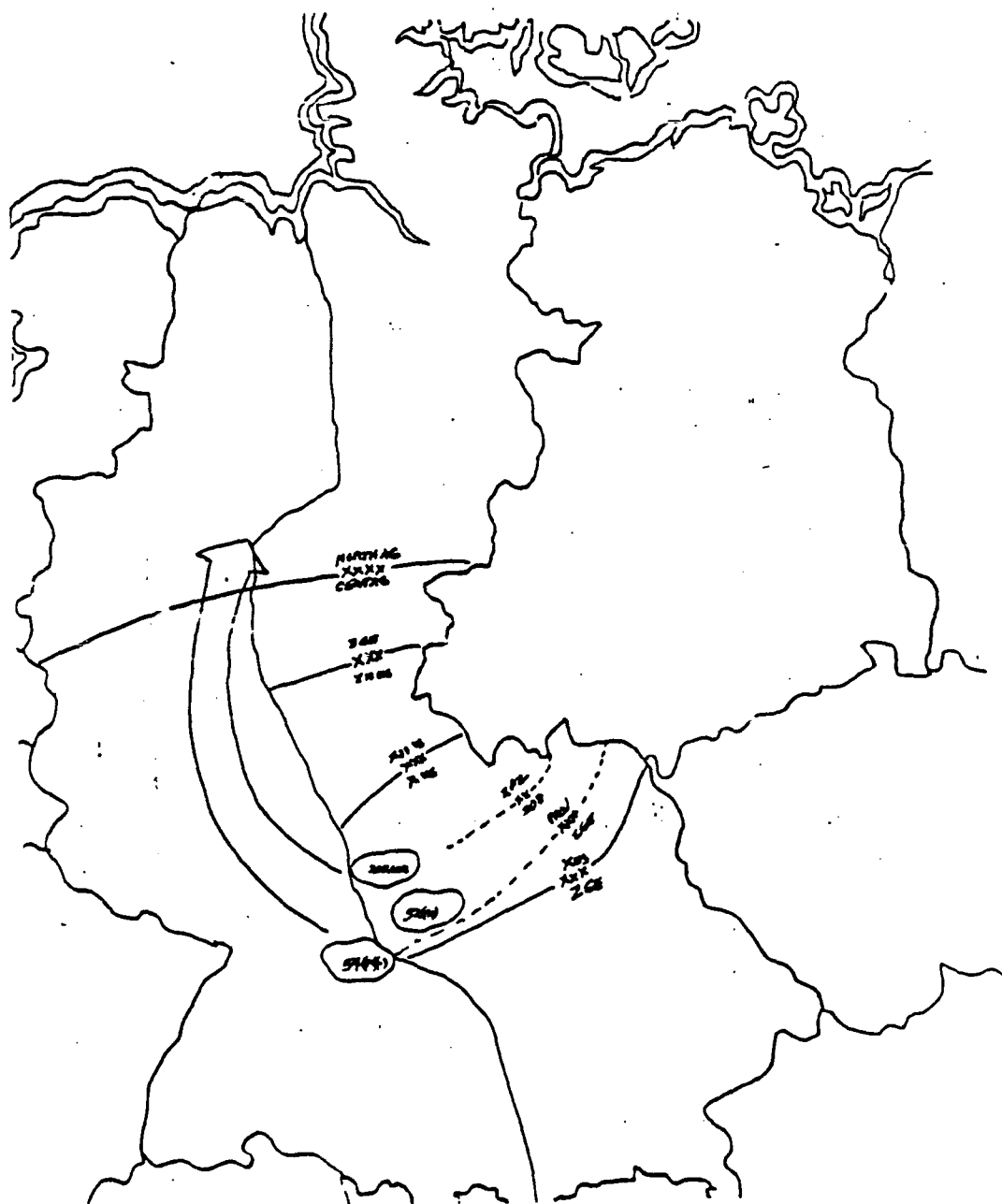


Illustration 8

Liaison Team / Communications STANAGS

German-US interconnections.

- a. In accordance with the rules of left to right and higher to lower following interconnecting possibilities exist:
 - (1) Corps to allied corps (Figures XLVIII & IL).
 - (2) Corps to attached allied division (Figures L & LI).
 - (3) Division to allied division (Figures XLVIII & IL).
 - (4) Division to attached allied brigade (Figures LII & LIII).
 - (5) Brigade to allied brigade.
- b. In all cases the requirements of STANAG 2101 are to be met, which state that liaison teams are to be exchanged. These liaison teams have to meet the following criteria:
 - (1) Liaison officer has to be able to speak the host language.
 - (2) The liaison officer must be familiar with the level of staff operations of the host headquarters.
 - (3) The liaison officer must provide his own transportation and means of communications to his parent units.
- c. In all cases the requirements of STANAG 5048 have to be met, which state that a minimum of communications circuits between headquarters have to be established as follows:
 - (1) Two each common user telephone circuits.
 - (2) One each sole user telephone FCC circuit.
 - (3) One each teletype/facsimile secure circuit. [For the brigade to brigade interconnect (Figure LIV) which primarily operates on the VHF-FM level, the multichannel access is provided through the division lateral link.]
- d. Higher to lower or lateral communications links require radio relay/MUX links of either 10/10 channels or of 20/20 channels. Keeping in mind that the corps to Corps links represent the alternate theater lateral communications means.

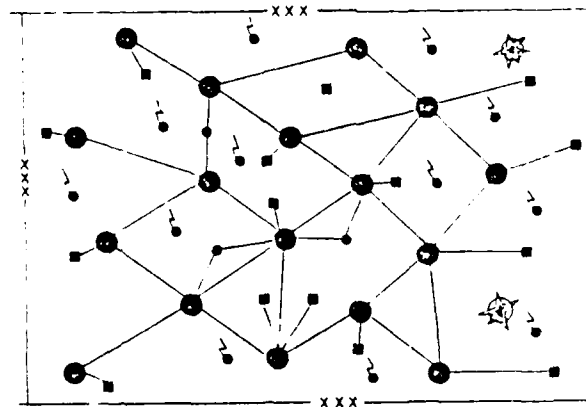
these links on demand order should have the capability to increase to a maximum of 24 channels. (Figure LV.) Channelization should be adapted to the needs but as a minimum should in addition to STANAG 5048, provide dial (DTMF long local; or dial pulse) capability to the switchboards (CV 1919; or AMTSZUSATZ), the respective liaison officer, the respective operators section (CTOC/DTOC/BTOC) and the respective commanders. Dial access for the US COMM center to the German AutoKo would alleviate the need for a separate GE COMM center at a US headquarters.

Equipment Interoperability is as follows:

- a. VHF-FM equipment. The US Army uses the AN/VRC-12 family of radios and the German Army uses SEM 25 radios. Both families of radios interoperate easily within the range of 30.00 to 69.95 MHz, but US equipment must operate in the old squelch position or squelch off position. Only drawback is the security factor, since US units are equipped with the new family of VINSON encryption devices and operate secure on just about all nets; the German counterpart does not have anything compatible. Consequence is the establishment of unsecure nets which requires coded transmission of secure information. Solution would be the development of equipment compatible with VINSON. On the short run the development of common standard word phrase code books should be considered. (Compatible band VHF-FM, Figure LVI.)
- b. HF-AM RATT radios. The US Army uses the AN/GRC-106 as the basic radio in all their HF-AM radio configurations such as the AN/GRC-142, AN/GRC-122, AN/VRC-2, and AN/GRC-26D, Rohde and Schwarz, ERB-281, and XK-405 radios. Compatibility is no problem. Security is not a problem since both sides use the KW-7 as encryption device for RATT operations and achieve teletype compatibility by modifying US teletypewriters to operate at 66 wpm (50 baud). AM voice operations security is becoming a problem due to the new encryption device, Parkhill, now being issued to US units. It encrypts the AM voice, a means formerly not available in the US Army. The same device can be used for end-to-end encryption of telephone circuits. No similar compatible device is at present in the German inventory.
- c. Radio relay/mux. Compatibility between US and GE radio relay/mux equipment is impossible; therefore, all interconnects have to be done at the voice frequency level. Keeping this factor in mind, it is clear that the link has to be provided in total from either side. The different interconnect possibilities are shown in the following figures.
 - (1) GE AutoKo to US Termination (Figure LVIII).
 - (2) US TASS to GE Termination (Corps) (Figure LIX).
 - (3) US TASS to GE Termination (Division) (Figure LX).
 - (4) Teletype interconnects (Figure LXI).

Illustration 9 Mobile Subscriber Equipment vs Analog Systems

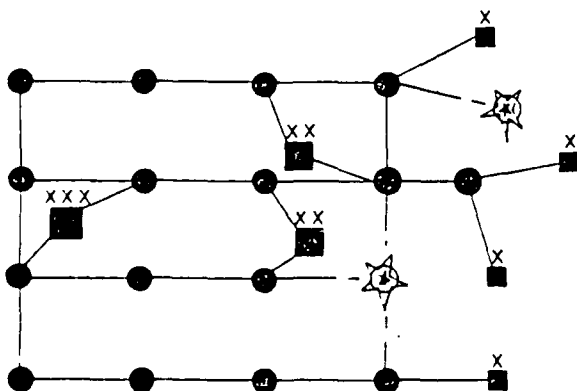
mobile subscriber equipment (MSE)



- Nodal centre
- radio links (35-40 kilometres)
- HQ with switch
- HQ with concentrator
- ~ Secondary HQ or isolated subscriber connected by automatic radio integration

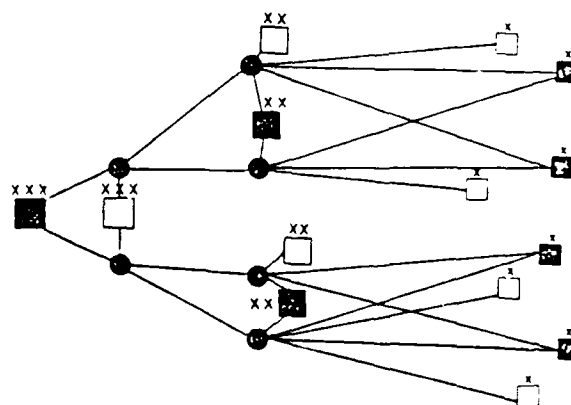
fully interoperable
encrypted, jam-resistant mobile tactical communications
equipment.

Area system, as exemplified by digital MSE
Explosions indicate communications nodes destroyed by enemy action



original analog system

Expanded chain of command system with
alternate HQs are shown as hollow squares



[illegible]

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